

Melbourne Romaine Carriker: 25 February 1915 – 25 February 2007

An Appreciation

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On 25 February 2007, our mentor, colleague, and great friend, Melbourne Romaine Carriker died at Lewes, Delaware. It was his ninety-second birthday. He was surrounded by his children and grandchildren.

Mel's life was as eventful and full as his scientific career. He was born 25 February 1915 to Melbourne Armstrong Carriker, Jr. and Myrtle Carmella Carriker on the family coffee plantation, *Vista Nieve*, near Santa Marta, Colombia. Mel detailed his boyhood experiences on the plantation in his memoir *Vista Nieve* (Carriker 2000). In 1925, at the age of ten, Mel participated in his first biological expedition accompanying his father, a world-class ornithologist and entomologist, to the eastern slope of the Andes.

The plantation was sold in 1927. After the sale, the family moved to Tom's River, New Jersey, and Mel's father became a curator of birds at the Academy of Natural Sciences of Philadelphia (ANSP). Mel attended the public schools and graduated from high school in 1934. In 1934 and early 1935, Mel and his father returned to the Andes in Bolivia on another ornithological expedition (Carriker, Jr. 2006). During the steamship trip, Mel demonstrated his remarkable abilities on the dance floor, exhibiting such skill that other dancers stopped to watch him and his partner. These displays were attributed to lessons provided by Mel's mother in Tom's River (Castillo and Holyoak 2004). This journey to the Andes was epic with train travel to the Alto Plano, a steamer across Lake Titicaca, and brushes with Bolivian troops fighting a war with Argentina (Carriker 2005, Carriker, Jr. 2006). It was during this expedition that Mel contracted malaria.

Mel entered Rutgers University in 1935 and he majored in agricultural research and minored in zoology, graduating with honors and a B.S. in Zoology in 1938. Mel noted, by playing a few minutes in a varsity match, he lettered in water polo. It was Mel's aim to become an ornithologist but in 1938, his undergraduate advisor, Thurlow C. Nelson, offered him a position to study population movements of oyster

larvae in Barnegat Bay, New Jersey. In fall 1938, he entered the University of Wisconsin and there earned a Master of Philosophy and, then, a Doctor of Philosophy degree in June 1943. During summers from 1938 through 1941, Mel returned to Great Bay, New Jersey, and in the summer of 1942 he was placed in charge of the Oyster Investigation Laboratory at Bivalve, New Jersey. These experiences launched his research on Mollusca. Mel joined the graduate student group of Lowell E. Noland to study *Lymnaea stagnalis* (Linné, 1758), the snail vector for swimmer's itch in humans. His doctoral dissertation focused on radular and digestive anatomy, physiology, and function of *L. stagnalis*.

During 1939 at Wisconsin, Mel met Meriel Roosevelt McAllister, known as Scottie. Following graduation from Wisconsin, Mel entered the Naval Officers Training program at Harvard College in June 1943 and emerged an Ensign in the United States Naval Reserve. On 17 October 1943, he and Scottie were married in Richmond, Virginia, at a ceremony officiated by Scottie's uncle. Mel and Scottie would have four sons: Eric, Bruce, Neal, and Robert. Mel was ordered for further training at Fort Schuyler, New York, followed by training in Miami, Florida. Mel was then ordered to the Aleutian Islands to serve aboard a small patrol craft with a crew of 60 men and 5 officers. Since the Japanese had been absent for several months, there was little to do but make patrols, during which his duties were standing watch and burning obsolete codes. Eventually, he was promoted to Lieutenant (junior grade) and was made executive officer (second-in-command). Between patrols, Mel collected muricid gastropods and their blood sera from the Aleutian waters for shipment. Mel laughed that the seamen thought this behavior was odd but forgave him because he was, after all, an officer, so odd behavior was expected. Mel placed these Alaskan collections in the alcohol-preserved collections at ANSP in the mid-1980s. Eventually his ship was sent to Pearl Harbor for escort duty, including escorting barges filled with pineapples. At the war's end, Mel was ordered to report for

duty aboard a destroyer, patrolling off the Philippines, and became a civilian again on 25 December 1945.

Mel and his family moved in with his mother at Belmar, New Jersey, though he spent some time at Madison, Wisconsin, publishing his dissertation. Although Mel had five offers for positions, he was persuaded by Thurlow Nelson to return to Rutgers and became a Lecturer of Zoology in 1946. Mel came to regret taking the position since many of the faculty remembered him as an undergraduate and still thought of him as such. Then as an Assistant Professor at Rutgers, he developed a graduate course in estuarine ecology and participated in field courses where students and Mel's colleagues from geology and botany studied one of three transects across the state. During 1947-1951, Mel, Thurlow Nelson, and Harold Haskin conducted studies on *Mercenaria mercenaria* (Linné, 1758) with a view to commercialization. Nelson and Haskin worked in Delaware Bay while Mel worked on Little Egg Harbor, New Jersey. By 1954, it became evident that Rutgers had room for only two marine biologists and Mel opted to accept a position as Assistant Professor at the University of North Carolina at Chapel Hill. During 1954 and 1955, Mel conducted research on oysters and clams on Gardner's Island, New York under the sponsorship of the U.S. Fish and Wildlife Service in cooperation with Victor Loosanoff.

While at UNC, Mel spent 1956 to 1960 doing research at North Carolina Institute of Fisheries Research. He also cooperated at the National Marine Fisheries Service Laboratory at Morehead City and the Duke University Marine Laboratory at Beaufort, North Carolina. During these summers, Mel focused his research on gastropods that drilled oysters. The chair of the department, Charles Jenner, headed both the limnology and marine ecology divisions of the department and undervalued Mel's contributions to the point that Mel was dismissed in 1961.

Mel then accepted a position at the U.S. Fish and Wildlife Service. Mel and his family moved to Easton, Maryland in the fall of 1961 and he took up his position at the Bureau of Commercial Fisheries Laboratory at Oxford, Maryland. As Chief of the Shellfish Mortality Program, Mel was in charge of research on MSX, the parasitic disease of *Crassostrea virginica* Gmelin, 1791 that was gaining a substantial hold on oyster populations in Chesapeake Bay. However, funding was problematic and frustrating. Just as Mel was beginning at Oxford, he was offered the position as director of the newly established Systematics-Ecology Program at the Marine Biological Laboratory at Woods Hole, Massachusetts.

The Systematics-Ecology Program operated successfully between 1962 and 1972 to study the flora and fauna of the western North Atlantic. Mel developed the keys to Woods Hole Region with Ralph I. Smith (Smith 1964). Mel believed

that the accurate identification of species was central to good ecological practice. In furtherance of this belief, Mel developed and supervised the publication of the series *Keys to the Flora and Fauna of the Northeast Atlantic Coast* for the National Marine Fisheries Service. During this time, Mel also served on the Northeastern Regional Council, assembled by the American Institute of Biological Sciences to study bioscience research to be conducted on a manned Earth-orbiting space station (Olive and Beem 1967). Mel famously made a motion picture of the drilling behavior of *Urosalpinx cinerea* (Say, 1822) that has since been placed on the Internet (<http://www.iwf.de/iwf/do/mkat/details.aspx?Signatur=C+13067>), along with amplified recordings of the rasping of the radula of muricids as they drilled through oyster shell. By 1972, federal funding was becoming scarce and Mel accepted a full professorship at the College of Marine Studies of the University of Delaware.

Mel (Fig. 1) was responsible for helping to lay out the new Harry L. Cannon Laboratory. He was instrumental in developing the shellfisheries program, and a new species of ameba found in the tanks was named in his honor (*Ovalopodini carrikeri* Sawyer, 1980). Mel taught graduate courses in malacology and supervised the research of doctoral students (see Carriker on AMS web site: Table 1) and master's students (AMS web site: Table 2). Mel also recruited experts in marine ecology who presented summer graduate courses. Mel served on the doctoral and master's committees of over 150 individuals since 1951 (AMS web site: Table 3).

Mel's research, over six decades, concentrated on the biology of *Crassostrea virginica* and its predator *Urosalpinx cinerea*. Mel believed that the biology and ecology of predator and prey were entwined and that one could not be understood without knowledge of the other. How does *U. cinerea* penetrate the shell of *C. virginica*? How do newly hatched *U. cinerea* find *C. virginica*? What are the structures and physiology of *U. cinerea* that allow it to bore a hole through the shell of *C. virginica* and other bivalves? Mel employed everything from simple field observations to x-ray microanalysis. His observations included sound recordings of the rasping of *U. cinerea* and cinematography (which can still be viewed on a web site). He was also among the first to apply scanning electron microscopy to the microstructure of the radula of *U. cinerea* and the shells of *C. virginica* and *Mytilus edulis* (Linnaeus, 1758). Mel identified the accessory boring organ (ABO) of the drills *U. cinerea* and *Eupleura caudate* (Say, 1822) and, through anatomical, histological, and histochemical methods, elucidated their structure and function in penetration of bivalve shells. Mel was able to link the shape of a bore hole with the snails that produced it even in paleontological specimens (Carriker and Yochelson 1968). Mel's studies also made use of histochemistry, and he examined the elemental analysis of major and minor trace

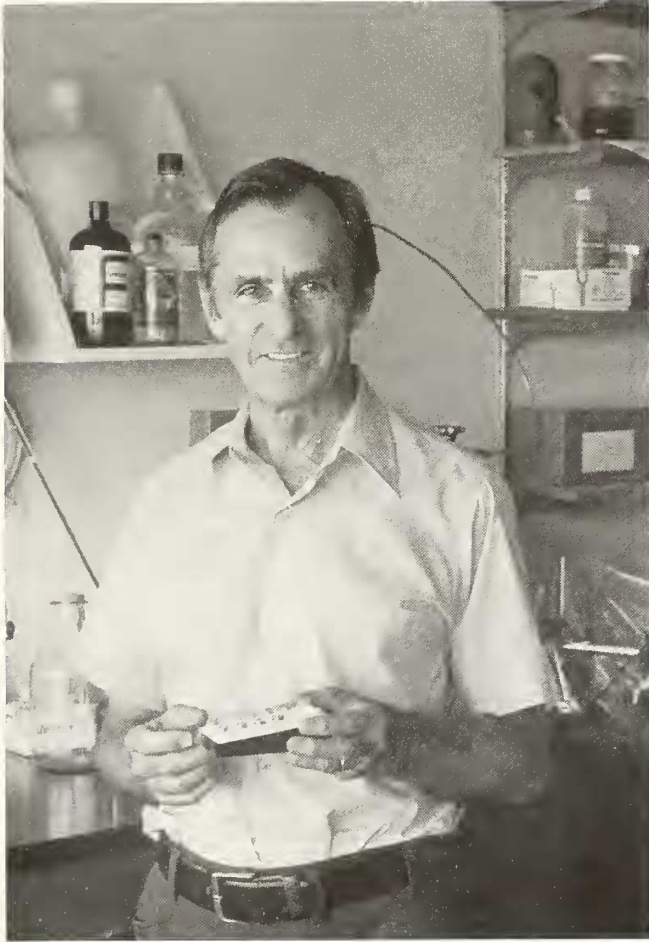


Figure 1. Mel Carriker in his laboratory early in his career at the University of Delaware, College of Marine Studies (now Graduate College of Marine and Earth Studies). University of Delaware stock photograph.

elements in oyster shell using a proton probe, developed by Charles P. Swann. Mel also studied chemoreception by *U. cinerea* and *E. caudata* with his student Betsy Brown and post-doctoral fellows Leslie G. Williams and Dan Rittschof. Mel continued to exercise his interest in estuarine pollution and its effects on the benthos, the invasion of coastal waters by exotic species and the impact of those invasions on commercially-valuable molluscan species. Mel summarized much of the results of his long study of oysters in Kennedy *et al.* (1996) and *Mercenaria mercenaria* in Kraeuthner and Castagna (2001).

Mel served in many scientific organizations. Mel was particularly active in the National Shellfisheries Association (NSA), and in 1998 the Association founded a student research grant in his name. In the NSA, he served as Treasurer, Secretary, Vice-President, President, and Editor of the *Pro-*

ceedings of the National Shellfisheries Association. Mel was named an Honored Life Member of the Association in 1991. Mel was instrumental in the transformation of the *Proceedings of the National Shellfisheries Association* into the *Journal of Shellfish Research*. In 2005, Mel published a history of the association: *The Taming of the Oyster*. Mel was also active in the American Malacological Society in which he served as Vice-President, President, Member of Council, and was named an Honorary Life Member. Mel was instrumental in the transformation of the *Bulletin of the American Malacological Union* into the *American Malacological Bulletin* and served as a founding Associate Editor. At the most recent meeting of the AMS, a Carriker Student Research Grant program was also founded. He was a member of the Institute of Malacology, which publishes *Malacologia*, and he long served on the editorial board of the *Quarterly Review of Biology*. Other professional societies included the American Society of Zoologists, the New England Estuarine Research Federation (in which he was an Honorary Life Member), and the Atlantic Estuarine Research Federation.

Mel retired from the University of Delaware in 1985 at the age of 70 and was named Professor Emeritus. A symposium was held in his honor on the Lewes campus at which many of his friends and colleagues presented papers (Prezant and Counts 1985). Mel was so esteemed among his students that in 2001, to honor his 85th birthday, his students surprised Mel with “Carrikerfest”, a celebration of his life to date [<http://darc.cms.udel.edu/carrikerfest2001/cfestindex.html>]. To further honor his contributions, his students and the university presented him with the Carriker Contemplative Garden just next to the shellfisheries laboratory. Mel, who walked to work on a daily basis, continued working at Lewes until two days before he suffered his stroke. During his emeritus years, Mel continued to submit annual activities reports to the Dean’s office, although he was no longer required to do so. Dr. Nancy Targett, Dean of the College, noted that Mel had more productive years in retirement than some faculty members aspire to during their active career. During his retirement, Mel published 31 papers, 4 book chapters, and 4 books. Mel served as president of the Delaware Partners in the Americas in which he worked for closer scientific cooperation between the University and Panama. He also actively served the Association of Marine Laboratories of the Caribbean. By 2000, Mel had published over 160 professional papers (AMS web site: Table 4) and reports, 45 abstracts, and more than 255 presentations at scientific meetings, a significant portion during his “retirement” years. Mel continued to participate in professional meetings throughout his professional life (Fig. 2). As was true throughout his entire career, Mel deeply respected his students and colleagues. This has been recognized by the National Shellfisheries Association and the American Mala-



Figure 2. Mel Carriker at the March 2006 MidAtlantic Malacologists meeting at the Delaware Museum of Natural History. Photo by Robert Robertson.

colological Society and, joining those professional organizations in memorializing Mel's dedication to his students, the University of Delaware, College of Marine and Earth Studies has now established the Melbourne R. Carriker Student Fellowship Endowment.

Mel will be remembered for his many professional and scientific accomplishments but those of us who were honored to be his friends and students will always treasure the warmth of his friendship, encouragement, high standard of professional conduct, and devotion to the advancement of science. All of us who knew Mel Carriker are better for it.

ACKNOWLEDGEMENTS

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ware, Peggy Conlon, and staff for assistance in assembling Mel's records and bibliography.

Note: A full listing of Mel's graduate students (including thesis and dissertation topics), a listing of those graduate students who had Mel sit on their research committees, and his complete bibliography can be found at the web site of the American Malacological Society: <http://www.malacological.org/>

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